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Comparing Three Measures of Mental Status: A Note on the Validity of Estimates of Psychological Disorder in the Community*

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In an attempt to refine the validity of the Gurin Mental Status Index, a group of 132 ex-patients living in the community were assessed with this instrument and two others, the Psychiatric Evaluation Form and the New Haven Schizophrenia Index. A factor analysis of the symptom items on the three instruments explained the divergence in overall assessment and revealed that the instruments tap varying aspects of behavior. The Gurin Mental Status Index measures neurotic symptomatology almost exclusively. This finding has implications for a new interpretation of the high prevalence of mental illness in the community found repeatedly when this instrument was used in the evaluation of mental status.

MAJOR studies of the prevalence of mental illness in the community, during the past twenty years, have found as much as 20 per cent of the general population with a level of symptomatology comparable to those who require treatment for psychiatric illness (Srole et al., 1962; Leighton, et al., 1963; Dohrenwend and Dohrenwend, 1965; Myers et al., 1971). In interpreting such findings, the question arises as to whether a high prevalence of psychiatric impairment really exists or is an artifact of the research instrument used to evaluate symptomatology. The study reported here, a comparison of assessments on three measures of mental status in which the issue of validity is explored, provides an answer to this question.

Versions of the same measure of mental status have been used in many community studies of psychological disorder. In the Stirling County Study (1963), Macmillan (1957) developed the Health Opinion Survey (H.O.S.), which included sixteen items taken in part from the World War II Neuropsychiatric Screening Adjunct. A number of H.O.S. items were used in the Midtown Study (1962). The Dohrenwends (1969) and Dohrenwend and Crandell (1970) have used a similar instrument in their work, as has Gurin (1960) in his national survey of mental health. Gurin's twenty item modified instrument has been used by Myers and Bean (1968) and Myers, Lindenthal, and Pepper (1971). It is Gurin's version of the instrument that is analyzed in this report. This patient self-report instrument measuring frequency of occurence of symptoms on a four point scale is shown in Table 1.

Validity studies indicate that this symptom inventory significantly discriminates between groups of psychiatric patients and non-patients living in the comunity (Macmillan, 1957; Semmence, 1969; Spiro, et al., 1971). Those judged by clinicians to be psychiatrically impaired are distinguished from those deemed to be unimpaired (Leighton, et al., 1963; Spiro, et al., 1972). In addition, Manis and his colleagues (1964) have demonstrated that this index discriminates between hospitalized and non-hospitalized groups. Dohrenwend and Crandell (1970) used

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TABLE 1. GURIN MENTAL STATUS INDEX (GMSI)

*	1. How often are you bothered by having an upset (sour, acid) stomach?
*	2. Have you ever been bothered by nervousness, feeling fidgety and tense?
**	3. Do you feel that you are bothered by all sorts of pains and ailments in different parts of your body?
*	4. Are you ever troubled by headaches or pains in the head?
*	5. Do you have loss of appetite?
*	6. Do you ever have any trouble in getting to sleep or staying asleep?
*	7. Do you find it difficult to get up in the morning?
**	8. Are you ever troubled by your hands or feet sweating so that they feel damp and clammy?
**	9. Has any ill health affected the amount of work you do?
**	10. Have you ever been bothered by shortness of breath when you were not exercising or working hard?
**	11. Have you ever felt that you were going to have a nervous breakdown?
**	12. Have you ever been bothered by your heart beating hard?
**	13. Do your hands ever tremble enough to bother you?
**	14. Do you ever drink more than you should?
**	15. Are you ever bothered by nightmares? (Dreams which frighten or upset you?)
**	16. Have you ever had spells of dizziness?
**	17. Do you tend to lose weight when you have something important bothering you?
**	18. Have there ever been times when you couldn't take care of things because you just couldn't get going?
*	19. For the most part, do you feel healthy enough to carry out the things you would like to do? (Reverse scoring)
	20. Do you have any particular physical or health trouble at present? 2. Yes 4. No

* 1. *Nearly all the time* 2. *Pretty often* 3. *Not very much* 4. *Never.*

** 1. *Many times* 2. *Sometimes* 3. *Hardly ever* 4. *Never.*

A total score is derived by summing the scaled response items. The range of possible scores is from 21 (impaired) to 80 (healthy).

this symptom inventory in a study of psychiatric symptomatology in clinic and hospitalized patients and community groups. They note that while a quantitative resemblance in symptomatology exists between patients and non-patients, patients have more severe symptoms than do non-patients. In their study, severity of symptoms was based on psychiatrists clinical judgments of symptom inventory items.

While concurrent validity studies of this symptom inventory have contrasted patient groups with non-patient groups, there is no report of any attempt to evaluate the same group of subjects with the Gurin Mental Status Index and one or more additional measures of mental status. The central question posed by validity studies is "What does the instrument measure?" In determining the validity of a research instrument to assess mental status, comparisons with other instruments focus on overall level of impairment. If the instruments measure the same dimension of behavior, agreement on level of impairment should be high. If agreement is low, the instruments obviously do not measure the same phenomenon. Divergence in agreement on overall level of symptomatology can be a springboard for investigating the varied dimensions of behavior measured by the instruments. The result is a clearer picture of the specific aspects of behavior measured by a given instrument.

In this paper, we report a comparison of three measures of mental status made on a group of 132 ex-patients living in the community. In addition to the Gurin Mental Status Index, the Psychiatric Evaluation Form (Endicott and Spitzer, 1973), and the New Haven Schizophrenia Index (Astrachan et al., 1973) were the research instruments used in the assessment of mental status. The latter two instruments are briefly described in Tables 2 and 3.

Data were collected in connection with a follow-up study on schizophrenia. All subjects were diagnosed and treated schizophrenics interviewed two to three years after discharge. Interviews were conducted by non-clinician research assistants who were specially trained to administer the instruments. The sample of ex-patients interviewed was primarily white (87 per cent), Christian (81 per cent), and made up of those in social classes III, IV, and V (80 per cent). Approximately an equal number were married as were single (41 per cent each), and females far out numbered males (63 per cent females, 37 per cent males). Sixty-eight per cent of the sample fell into the twenty-to-forty age

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TABLE 2. PSYCHIATRIC EVALUATION FORM (PEF)

The Psychiatric Evaluation Form (PEF) is an interviewer rating instrument which records scaled judgments of a subject's functioning during a one week period. The PEF covers dimensions of psychopathology of traditional interest bearing close correspondence to the mental status examination. Judgments of severity take into account intensity and duration of symptomatology and are made on six point scales ranging from "none" to "extreme." The 16 PEF items included in our study are shown below.

	1 None	2 Minimal	3 Mild	4 Moderate	5 Severe	6 Extensive
1. Agitation-excitement						
2. Suicide-self mutilation						
3. Grandiosity						
4. Somatic Concerns						
5. Speech Disorganization						
6. Hallucinations						
7. Social Isolation						
8. Belligerence-Negativism						
9. Disorientation-memory						
10. Anxiety						
11. Inappropriate						
12. Suspicion-Persecution						
13. Denial of Illness						
14. Depression						
15. Retardation-lack of emotion						
16. Overall severity of illness (this item was used as a summary measure of the illness)						

It should be noted that we omitted the following PEF items: Narcotics-Drugs, Antisocial Attitudes-Acts, Alcohol Abuse, Daily Routine-Leisure Time, and Role Impairment Scales.

group. In addition to an evaluation of mental status, assessment of status at outcome included social adjustment and role performance, treatment status and treatment history since discharge, and consumer satisfaction.

Agreement on Overall Assessment

To explore the extent to which the instruments agree on assessment of level of psychiatric symptomatology, the data were analyzed by categories, ranks, and correlations. Gurin Mental Status Index scores were classified into low (healthy), medium, and high (impaired) categories of level of impairment as defined by Gurin and shown in Table 4. The other two instruments were similarly classified. When the three instruments are compared by level of impairment categories, it is quite apparent that the Gurin Mental Status Index systematically defines the sample as more impaired than the other instruments. Forty-eight per cent of the sample falls into the High (Impaired) category with this instrument as compared to 23 per cent with the New Haven Schizophrenia Index and 13 per cent with the Psychiatric Evaluation Form. The difference in overall assessment by these three instruments is statistically significant ($\chi^2 = 61.47$; $p = < .001$).

Because one may argue that the predetermined categories "low," "medium," and "high" as defined in Table 4 may not be comparable across instruments, we ranked scores on each instrument from highest to lowest and divided them into highest (impaired), middle, and lowest thirds. We then compared rankings on one instrument with those on another. There is a tendency for the ranking of scores on one instrument to correspond with those of another, as evidenced by the heavy loading of diagonal cells—Highest Third-Highest Third; Middle Third-Middle Third; and Lowest Third-Lowest Third—in each comparison shown in Table 5. However, differences in ranking by instrument are statistically significant in each case.

The less than perfect relationship in overall assessment among the three instruments is further clarified by examining

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TABLE 3. NEW HAVEN SCHIZOPHRENIA INDEX (NHSI)

The New Haven Schizophrenia Index (NHSI) is an interviewer assessment instrument noting the presence or absence of commonly seen symptoms of schizophrenia. The NHSI, which contains 21 items on a dichotomous yes/no scale, formalizes a clinical stereotype of what is commonly called schizophrenia for diagnostic purposes. The NHSI is shown below, along with its scoring system.

Symptoms	Yes	No
1. (a) Delusions (not specified or other than depressive)	___	___
(b) Hallucinations (auditory)	___	___
(c) Hallucinations (visual)	___	___
(d) Hallucinations (other)	___	___
2. Crazy thinking and/or thought disorder (any of the following)		
(a) Bizarre thinking	___	___
(b) Autism or grossly unrealistic private thoughts	___	___
(c) Looseness of association, illogical thinking, overinclusion	___	___
(d) Blocking	___	___
(e) Concreteness	___	___
(f) Derealization	___	___
(g) Depersonalization	___	___
3. Inappropriate Affect	___	___
4. Confusion	___	___
5. Paranoid ideation (self-referential thinking, suspiciousness)	___	___
6. Catatonic Behavior		
(a) Excitement	___	___
(b) Stupor	___	___
(c) Waxy flexibility	___	___
(d) Negativism	___	___
(e) Mutism	___	___
(f) Echolalia	___	___
(g) Stereotyped Motor Activity	___	___

Scoring System

To be considered part of the schizophrenic group, the patient must score on Item 1 or Items 2a, 2b, 2c, and must attain a total score of at least 4 points.

He can achieve a maximum of 4 points on item 1; 2 for the presence of delusions; 2 for hallucinations.

On Item 2 he can score 2 points for *any* of symptoms *a* through *c*, 1 point for any or all of symptoms *d* through *e*, and 1 point each for *f* and *g*. He can thus score a maximum of 5 points on Item 2. Items 3, 4, 5, and 6 each receive 1 point.

Note: Where the 4th point necessary for inclusion in the sample is provided by 2d or 2e, these symptoms are not scored.

correlation coefficients. The instruments with the most divergent assessments of symptomatology are the Gurin Mental Status Index and the New Haven Schizophrenia Index (R=.39). The overall assessment made with the Gurin Mental Status Index is more highly correlated with the Psychiatric Evaluation Form (R=.55). However, the two most similar instruments in overall assessment are the Psychiatric Evaluation Form and the New Haven Schizophrenia Index (R=.67).

Data analysis of the three instruments by categories, ranks, and correlations clearly reveals a lack of agreement in assessment of overall level of impairment. In an effort to explain the divergence in level of agreement, a multiple correlation and regression analysis was undertaken. Level of Agreement, the dependent variable, was defined as "High" if as many as two of the three scores were the same category (based on thirds) and the third score only one category away. Agreement was defined as "Low" if as many as two of the three scores were totally divergent, i.e., "High" and "Low." The remainder of the scores were placed into an intermediate category. Variance in level of agreement was not substantially explained by any of the independent variables in this analysis, which included age, race, social class, sex, marital status, type of discharge from the hospital, condition upon discharge, number of previous hospitalizations, and the ten research assistant raters who administered the instruments. From this finding, we hypothesized that the three measures of mental status do not agree because they tap differing aspects of psychiatric symptomatology.

What Do the Three Instruments Measure?

In order to explore further the divergence among the three measures, a symptom by symptom correlation matrix was obtained. This analysis showed a high intercorrelation of symptom items within and among the instruments. A factor analysis of all symptom items was then performed. Five factors were extracted from the rotated analysis of 62 items. (See Table 6.) Thirty-

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TABLE 4. AGREEMENT ON OVERALL ASSESSMENT OF LEVEL OF IMPAIRMENT IN 132 SCHIZOPHRENICS ON FOLLOW-UP WITH PSYCHIATRIC EVALUATION FORM (PEF), NEW HAVEN SCHIZOPHRENIA INDEX (NHSI), AND GURIN MENTAL STATUS INDEX (GMSI)

Research Instrument	Low (Healthy)		Medium		High (Impaired)			
	%	N	%	N	%	N	%	N
PEF*	(45)	60	(42)	55	(13)	17	100	132
NHSI**	(31)	41	(46)	61	(23)	30	100	132
GMSI***	(9)	12	(43)	57	(48)	63	100	132

$\chi^2 = 61.47$; 4df; $p = <.001$

*PEF [Low = 1, 2; Medium = 3, 4; High = 5, 6] The range of PEF scores in our sample was from 1–6. The mean was 2.81.

**NHSI [Low = 0; Medium = 1, 2; High = 3 +] The range of NHSI scores in our sample was from 0–11. The mean score was 2.23.

***GMSI [Low = 77–80; Medium = 67–76; High = 21–66] The range of GMSI scores in our sample was from 31–80. The mean score was 64.44.

seven items loaded .5 or above, with no overlap across factors at that level. The factors were conceptually meaningful to us. Factor one, the Neurotic Factor, contains twelve Gurin Mental Status Index items and five Psychiatric Evaluation Form items, including "anxiety," "depression," and "somatic concerns." The second factor

TABLE . COMPARISON OF RANKING OF SCORES BY THIRDS ON THREE TESTS (N = 132)

Gurin Mental Status Index	Psychiatric Evaluation Form: Lowest Third		Middle Third		Highest Third*	
	%	N	%	N	%	N
Lowest Third	(45.6)	20	(31.8)	14	(22.7)	10
Middle Third	(43.2)	19	(36.4)	16	(20.5)	9
Highest Third	(11.4)	5	(31.8)	14	(56.8)	25

$\chi^2 = 20.727$; 4df; $p = <.001$.

Psychiatric Evaluation Form	New Haven Schizophrenia Index: Lowest Third		Middle Third		Highest Third*	
	%	N	%	N	%	N
Lowest Third	(70.5)	31	(27.2)	12	(2.3)	1
Middle Third	(25.0)	11	(54.5)	24	(20.5)	9
Highest Third	(4.5)	2	(18.2)	8	(77.3)	34

$\chi^2 = 79.909$; 4df; $p = <.001$.

Gurin Mental Status Index	New Haven Schizophrenia Index: Lowest Third		Middle Third		Highest Third*	
	%	N	%	N	%	N
Lowest Third	(52.3)	23	(22.7)	10	(25.0)	11
Middle Third	(34.1)	15	(43.2)	19	(22.7)	10
Highest Third	(13.6)	6	(34.1)	15	(52.3)	23

$\chi^2 = 19.773$; 4df; $p = <.001$.

* Highest third is most impaired.

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is clearly the Schizophrenia Factor, containing many of the severe symptoms of this disorder. Factors 3, 4, and 5 are labelled the Motor Retardation, Hallucinations-Delusional, and Turbulent factors respectively, and are made up exclusively

TABLE 6. ROTATED FACTOR ANALYSIS OF SYMPTOM ITEMS IN GURIN MENTAL STATUS INDEX, PSYCHIATRIC EVALUATION FORM, AND NEW HAVEN SCHIZOPHRENIA INDEX

		Factors *				
		1	2	3	4	5
	Per Cent of Communality	38.60	19.31	12.86	13.26	15.97
GMSI	Upset stomach	N .521	S	M	H	T
	Nervousness	E .735	C	O	A	U
	Pains—ailments	U .686	H	T	L	R
	Headaches	R .590	I	O	L	B
	Insomnia	O .577	Z	R	U	U
	Ill health affects work	T .717	O		C	L
	Shortness of breath	I .610	P		I	E
	Afraid of nervous breakdown	C .676	H	R	N	N
	Hands tremble	.623	R	E	A	T
	Spells of dizziness	F .622	E	T	T	
	Can't take care of things	A .621	N	A	I	
	Healthy enough to function	C .548	I	R	O	F
PEF	Agitation—excitement	T .530	A	D	N	A
	Suicide—self-mutilation	O .567		A	S	C
	Somatic concerns	R .539		T		T
	Anxiety	.763	F	I		O
	Depression	.690	A	O	D	R
			C	N	E	
			T		L	
PEF	Grandiosity		O .595		U	
	Speech disorganization		R .708	F	S	
	Inappropriate behavior		.534	A	I	
	Suspicion—persecution		.606	C	O	
NHSI	Delusions, unspecified		.694	T	N	
	Looseness of association		.659	O	A	
	Inappropriate affect		.516	R	L	
PEF	Retard/lack of emotion			— .603	F	
NHSI	Reduced motor activity			— .641	A	
	Stereotyped motor activity			— .599	C	
					T	
					O	
PEF	Hallucinations				R .845	
NHSI	Delusions, depressive				.550	
	Hallucinations, auditory				.727	
	Hallucinations, visual				.673	
NHSI	Chaotic interpersonal relationships					.514
	Bizarre thinking					.597
	Derealization					.608
	Negativism					.599
	Concreteness					.627
	Mutism					.562

* 1. Neurotic Factor.
2. Schizophrenia Factor.
3. Motor Retardation Factor.
4. Hallucinations Delusional Factor.
5. Turbulent Factor.

Total Communality	24.439
No. Variables Used in Analysis	62
No. Loaded under .500	25
No. Variables shown in Chart	37
No. Subjects	132

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TABLE 7. CORRELATIONS OF TOTAL SCORES WITH FACTOR SCORES

	Factors				
	1	2	3	4	5
Gurin Mental Status Index	.967**	.060	—.041	.098	.005
Psychiatric Evaluation Form	.566**	.454***	—.180*	.135	.267**
New Haven Schizophrenia Index	.300**	.602**	—.288**	.276**	.502**
	NEUROTIC FACTOR	SCHIZOPHRENIA FACTOR	MOTOR RETARDATION FACTOR	HALLUCINATIONS DELUSIONAL FACTOR	TURBULENT FACTOR

* = significant .05.
** = significant .01.

of Psychiatric Evaluation Form and New Haven Schizophrenia Index Items.

In order to document more thoroughly the aspects of symptomatology measured by the three research instruments, total scores on each instrument were correlated with factor scores. (See Table 7.) This analysis demonstrates that the three measures of mental status tap varying aspects of symptomatology, thus accounting for divergence in overall assessment. The Gurin Mental Status Index score correlates .967 with factors scores on the Neurotic Factor. The GMSI measures this aspect of symptomatology almost exclusively. The Psychiatric Evaluation Form, while tapping a significant amount of the Neurotic Factor, also correlates highly with the Schizophrenia Factor. However, it is the New Haven Schizophrenia Index that is most sensitive to the Schizophrenia Factor and to other aspects of psychotic symtomatology measured by the Turbulent Factor, the Motor Retardation Factor, and the Hallucinations-Delusional Factor. The lack of a higher correlation in overall assessment by these three instruments is explained by their varying sensitivity to different aspects of psychiatric symptomatology.

Discussion

The high prevalance of psychiatric impairment found repeatedly in community

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studies using versions of the same symptom inventory can be interpreted as a high prevalence of the Neurotic Factor. The Gurin Mental Status Index does not overestimate the prevalence of psychiatric symptomatology so much as it measures only one aspect of symptomatology. Our findings suggest that one cannot conclude that 20 percent of the general population are so grossly impaired psychologically that they display psychotic symptomatology. When an instrument which taps this dimension of behavior is used, such as the Psychiatric Evaluation Form or the New Haven Schizophrenia Index, overall impairment is not as high. Indeed, it is plausable that symptoms of anxiety and depression are more widely distributed in the population than psychotic symptomatology, even among treated schizophrenics living in the community.

It is important to note that psychotic symptoms are not independent of symptoms of anxiety, depression, or somatic concerns. There is a strong trend for symptoms to be highly intercorrelated. Because of this, it is possible that a psychotic or post-psychotic group will show higher levels of anxiety and depression than normals. Therefore, they should be more impaired on the Neurotic Factor.

To test this notion, the sample of 132 schizophrenics was compared on level of impairment to a sample of 938 non-patients living in the community (Myers et al., 1971). Both groups were assessed with the Gurin Mental Status Index, which measures the Neurotic Factor. While 18 percent of the community population in Myers sample were classified as impaired, 48 percent of the schizophrenics fell into this category. (See Table 8.) The Gurin Mental Status Index significantly distinguishes the level of impairment found in the schizophrenics from that found in the normal group. The schizophrenics are more impaired on the Neurotic Factor than are non-patients.

It is the high intercorrelation of psychotic and neurotic symptoms that makes the Gurin Mental Status Index work. This is precisely why it is successful in distinguishing patient groups from non-patient groups. As such, it is extremely useful as a screening instrument for use in large community studies or projects. However, its lack of sensitivity to psychotic symptomatology makes it less useful for a follow-up study or a clinical study in which a fine assessment of symptomatology is desired. Studies which focus on highly specific aspects of psychiatric symptomatology, such as schizophrenia or depression, require research instruments that are sensitive to these dimensions of behavior.

Further, it cannot necessarily be concluded that because 20 per cent of the general population is impaired according to Gurin Mental Status Index, they are all in need of psychiatric treatment. One can more easily contend that those who display psychotic symptoms are clearly in need of treatment. The Gurin Mental Status Index probably overestimates the need for psychiatric services. In assessing prevalence of psychiatric disorder in the community for

TABLE 8. COMPARISON OF COMMUNITY SAMPLE AND SCHIZOPHRENICS ON GURIN MENTAL STATUS INDEX RANKINGS*

	Level of Impairment							
	Low (Healthy)		Medium		High (Impaired)		Total	
	%	N	%	N	%	N	%	N
Community sample	(35)	327	(47)	442	(18)	169	(100)	938
Schizophrenics	(9)	12	(43)	57	(48)	63	(100)	132

$\chi^2 = 70.42$; 2df; $p = <.001$.
* Low = 77–80; Medium = 67–76; High = 21–66.

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the purpose of setting up treatment programs, one should make use of a reseach instrument that taps psychotic as well as neurotic behavior.

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